The role of small robots in designed play workshops in centers of adults with cerebral palsy

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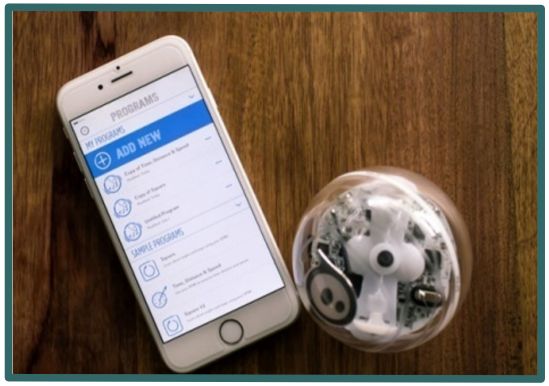
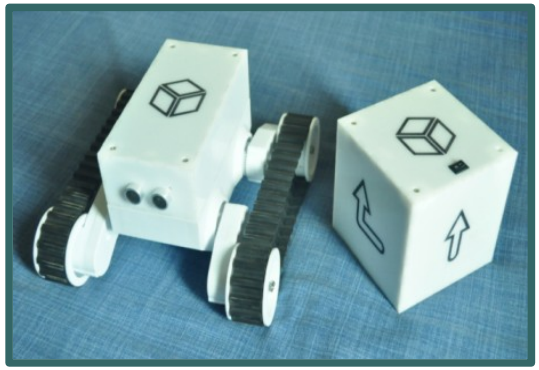
The Idea





Improving Skills

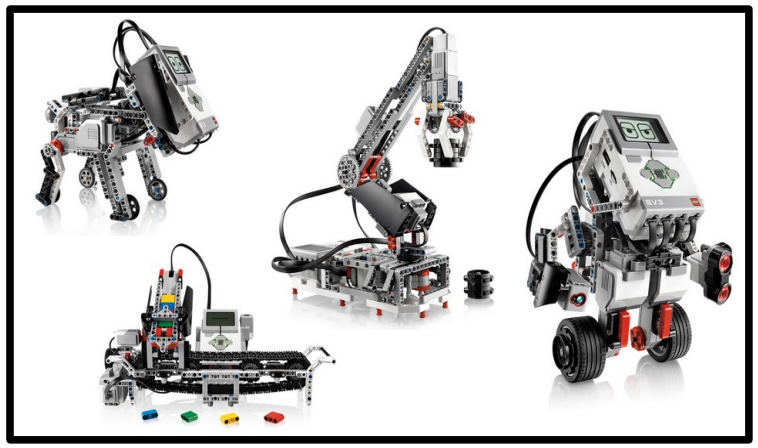
- Cognitive
- Motor
- Social

Background

- Impact on quality of life is still unexplored due to the fact that social robots are still expensive
- Term Socially Assistive Robots, as intersection between Assistive Robots used in rehabilitation therapies and Social Interactive Robots, robots used like companion
- Lack of measurement scales for evaluating scenarios and game devices as well as its design

Background

- Using in home Lego Mindstorm robots with CP children:



Background

- Working in the school with a Robotic arm accesible to them. **Motivation** is higher than using a switch or a computer program.
- **Enhance perception** using tangible interfaces.
- **Gameability**: quality of the user interaction with the game.
- User takes an **active part** contributing to the adaptations of interfaces according to their needs.

Methodology

Participants: A group of seven users ranging from 24 to 43 (mean 33,8 ± 5,7) attending the day center of ASPACE took part in three to six sessions

Methodology

Materials:

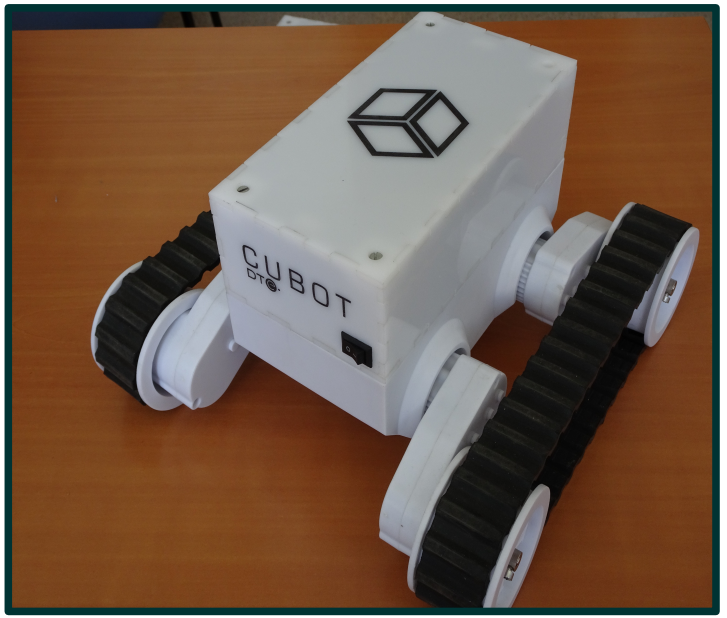
SPHERO: A robotic ball with various internal motors to roll in any direction. It has lights and sounds. Several applications for mobile devices allow its control. Bluetooth communication.

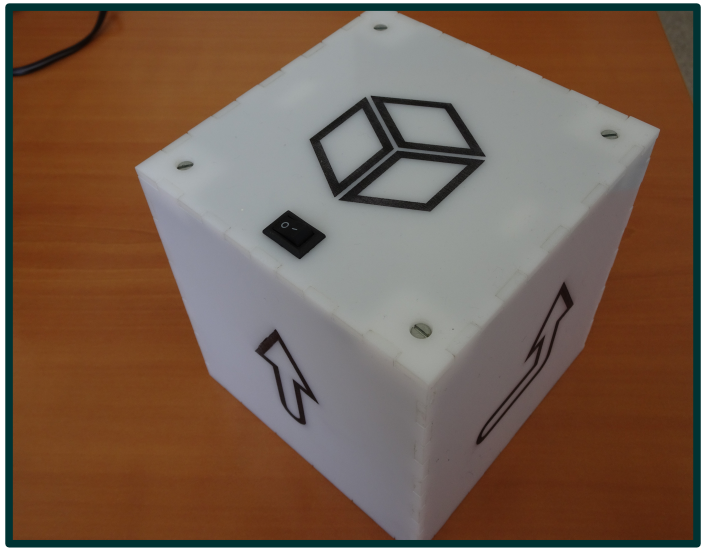
Methodology

Materials:

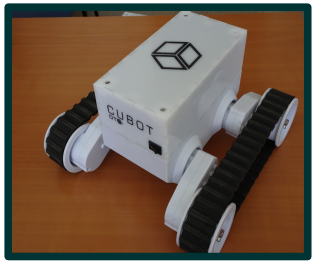
CUBOT: Prototype. Formed by two devices, a little robot in the form of a motorized vehicle and a cube shaped control device.

Each side of the cube has a carved arrow on its surface that illustrates each action of the robot. The side on the top determines the movement of the vehicle.



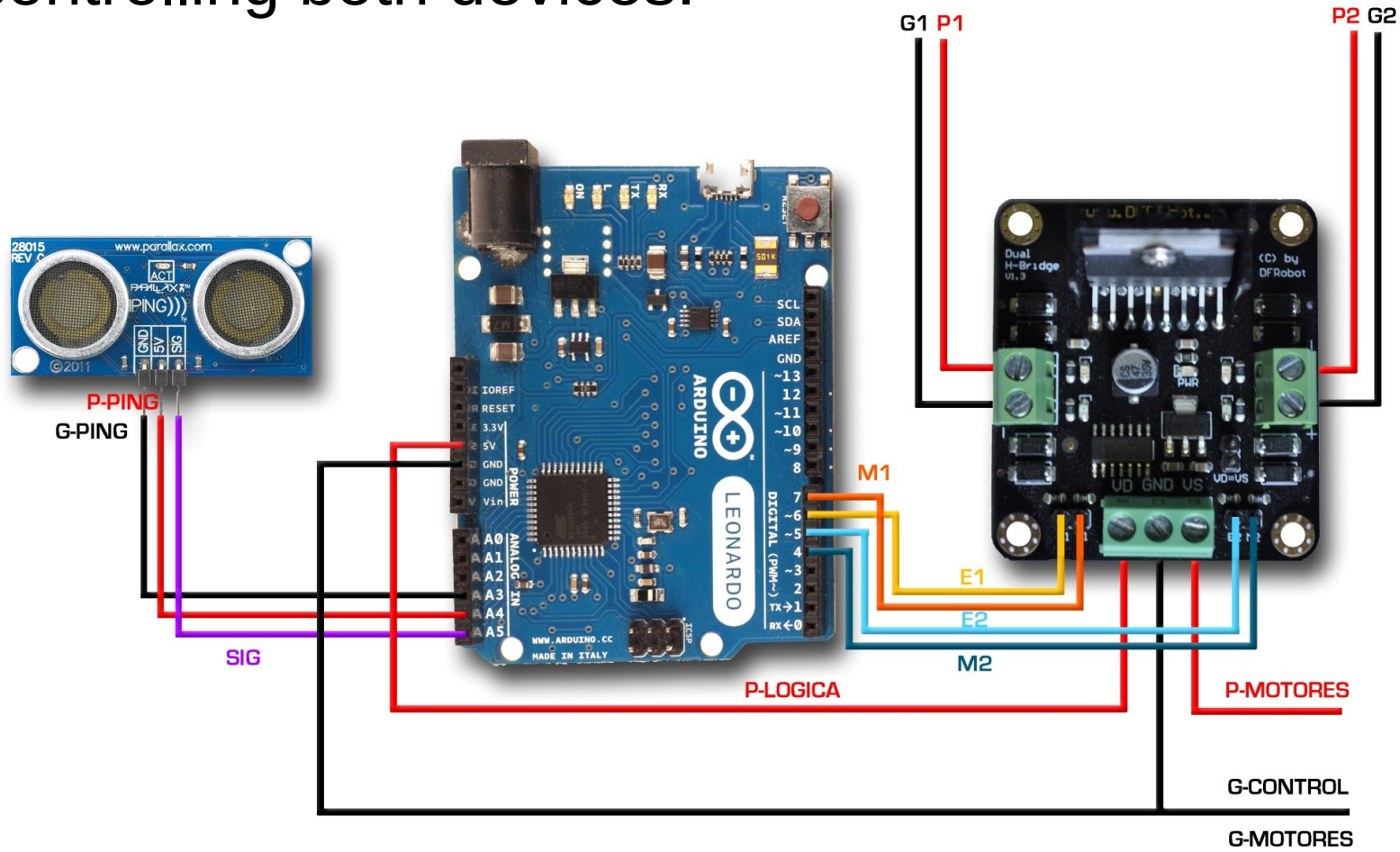


Methodology



Materials:

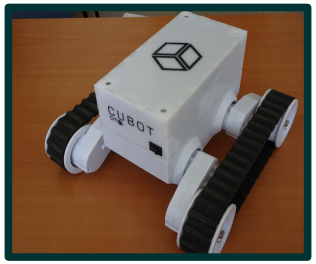
CUBOT Two Arduino Leonardo boards are in charge of controlling both devices.

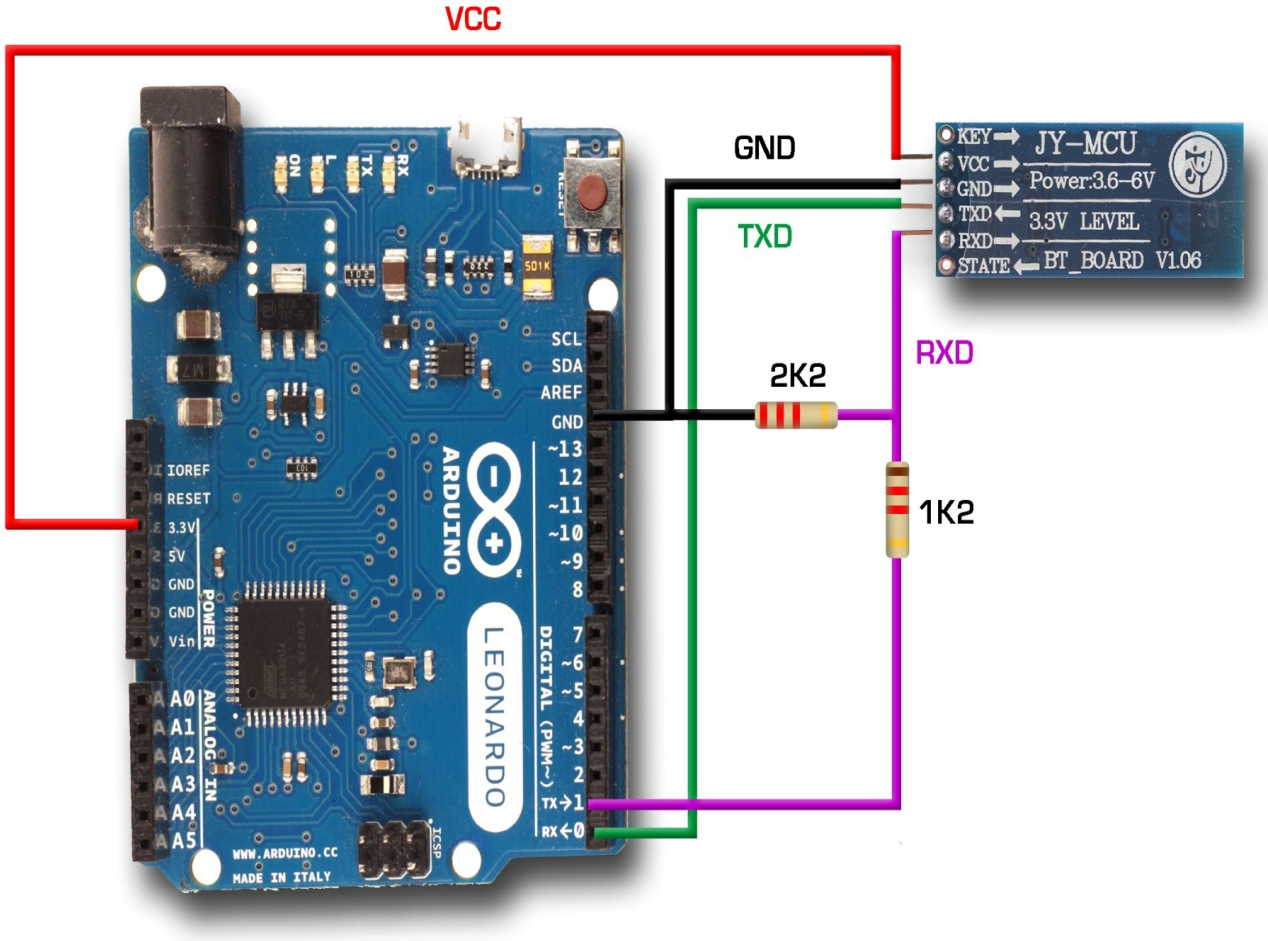


Methodology

Materials:

CUBOT





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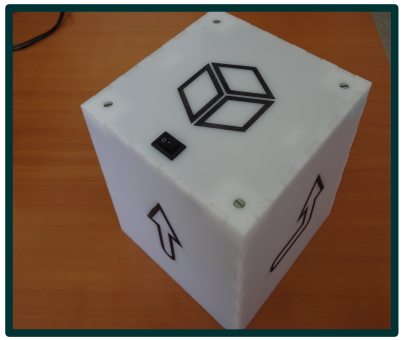

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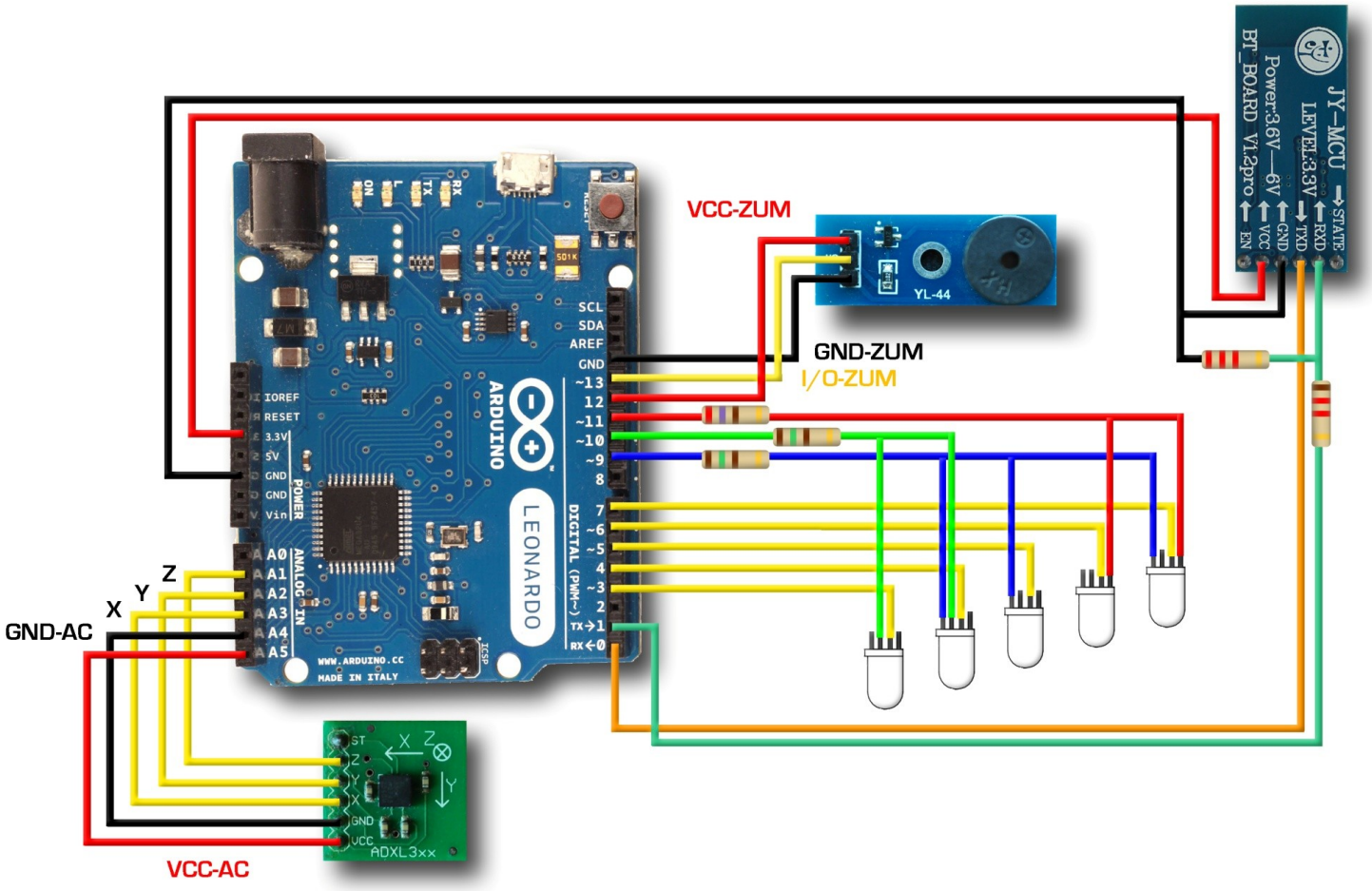

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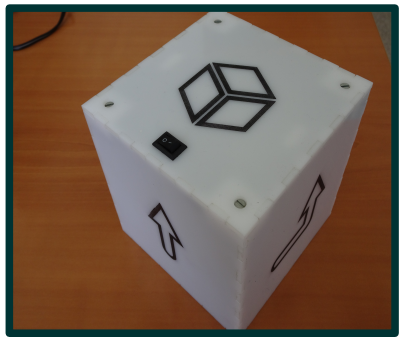
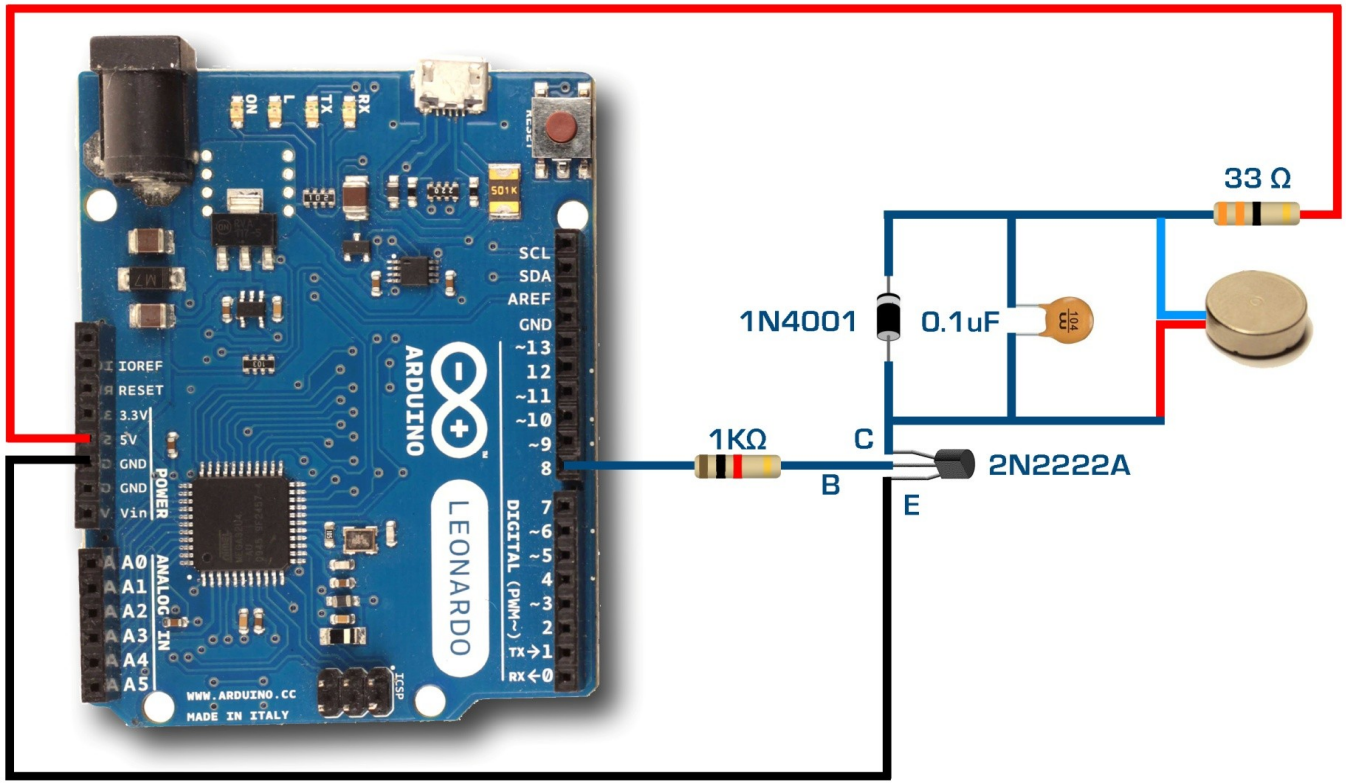
CUBOT





Methodology

Intervention:

CUBOT, controlled by turning the cube in five different positions. Motor skills can be improved. The subject is asked that turn the cube in several positions. Only spot tests with some users.

Methodology

Intervention:

SPHERO

Different circuits drawn on the floor that the robot had to follow.

First one for users familiarization and fun.

Bottles filled with sand to emphasize the path.

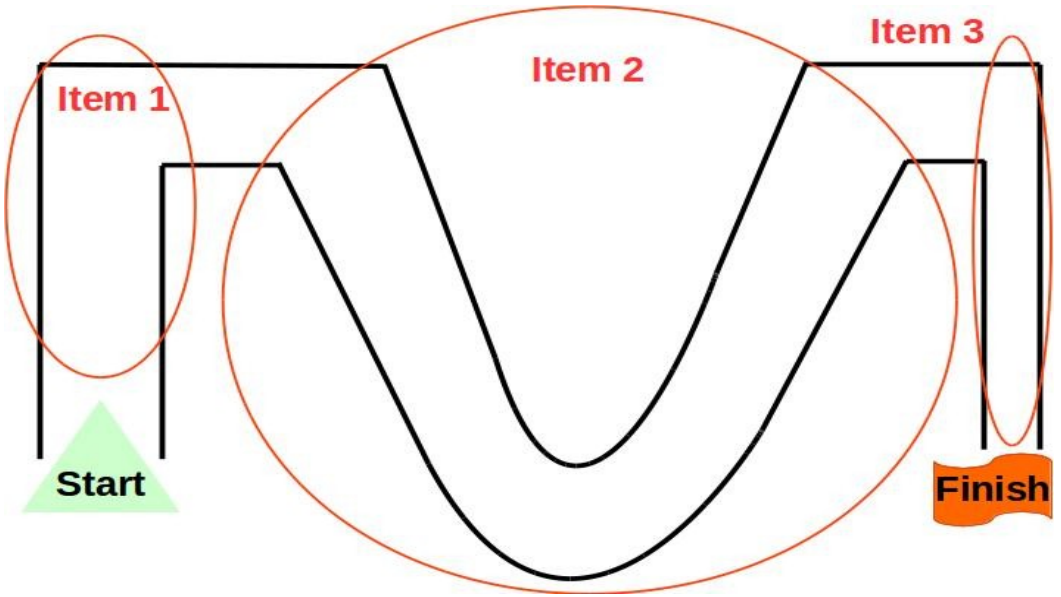
The last goal: to pull the pins placed at the end of the circuit

Methodology

Intervention:

SPHERO

Following sessions a circuit with three items. If the lines were past is an error and counted then for the results. The time is also measured. Different sessions with this last circuit are done in order to notice the evolution in the skill to manipulate the robot.



Methodology

Intervention:

SPHERO can be controlled through an application that was installed in a tablet or IPAD, so the access method was the touch screen or any other adaptation that can be used with the tablet.

Results

- All participants showed a high interest to participate in games with CUBOT and SPHERO, but SPHERO was funnier for them.

- Related with quantitative results, data do not show clear information about evolution of users. The only thing is that in general, session 1 is the worst..

Conclusions

- In the CP population, the use of small robots is a good option in activities using for develop skills related with technologies familiarization. motor improvement, coordination and temporal concepts.
- Games with family and friends enhance social relationships.
- Users acquire security and understand the control of this kind of robots in a short time, so they don’t bored during the learning time and don’t feel frustrated with the new technology.

Conclusions

- For people with CP, CUBOT has difficulties due to the need of control with the cube; an alternative can be adding another kinds of control it. An application for tablet expands the range of users.

- Proper scales to measure the effect of interventions are needed.

Thank you

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